so long a period was required either to decrease or increase the warmth of the cells, that it would be impossible to guard against those sudden changes of temperature so commonly experienced in England. This would certainly be the case, were it not for a property of self-adjustment possessed by the apparatus, in virtue of a law governing the radiation of caloric from heated surfaces. The influence of this property is shewn by the fact, that when the external air is at 20 to 25 degrees, an increase of from 25 to 30 degrees upon that temperature is, without difficulty, obtained in the cells; but if the external air suddenly rise to 48 or 50 degrees, instead of obtaining, as before, that which would now be an inconvenient addition of 25 degrees, or more, by the effect of the apparatus, we find only from 10 to 12 degrees increase on the atmosperic temperature produced in the air of the cells, the combustion of coal in the apparatus remaining the same.

The following table, taken from the prison register, exemplifies the adjusting power of the apparatus:—

Date.	Minimum temperature of External Air.	Minimum temperature of the Cells.
1844	°	°
January 1	33	60
,, 2	31	60
,, 3	22	57
,, 4	23	57
,, 5	42	57
,, 6	46	58
,, 7	39	60

It appears by this table that when the external air was 31 degrees the cells were 60 degrees, and when the former was 46 degrees the latter were 58 degrees, so that when the external air was 15 degrees hotter the cells were 2 degrees colder. It also shews that the night temperature of the cells ranged between 57 and 60 degrees.

This property of self-adjustment has, up to the present time, shewn a sufficient range to remedy the inconvenience felt on sudden accessions of warm weather.

At the commencement of the present winter the cells were brought to a higher temperature than could have been wished, owing to the unexpected increase of effect produced by the heating apparatus, which in consequence of the flues being dry, acted more powerfully when 1 cwt. of coal was consumed during the 24 hours, than it did last year with a consumption of 3 cwt.; nor did even 5 cwt. suffice to raise the temperature to its present height when the prison was first erected, as was shewn by results obtained from experiments made during the winter of 1841 and 1842. This great difference in effect is undoubtedly to be accounted for by the present dry state of the building, the greater part of the coal used during former years having been expended in vaporization of water, and consequently productive of no effect upon the air passing into the cells. It had been anticipated that owing to this circumstance, some difference of effect would be found in the action of the apparatus, and the furnaces for the winter fires were consequently built in at the commencement of the season, so as to burn only 1 cwt. of coal during the 24 hours, a rate of combustion which will now suffice to guard against the frosts of the winter, but which proved somewhat too powerful in effect for the mild weather experienced at the commencement of the present season. G. Owen Rees,

Principal Medical Officer."

Lighting of the Chapel Royal, Buckingham Palace.—Prince Albert inspected the lighting of the Chapel Royal at Buckingham Palace a few evenings since. The chapel has been fitted up with gas lights inclosed in large glass globes ornamented with appropriate inscriptions, and fixed upon handsome *ormolu* columns. They are ventilated upon Professor Faraday's principle of conveying away from the lights all the noxious products of combustion, by means of a descending draught, which is obtained in this instance by the assistance of Dr. Reid's ventilating shaft and apparatus. The Prince expressed himself much pleased with the perfect success of this application of that invention, as well as with the chaste and brilliant effect produced by the lights.

FIRE-PROOF WAREHOUSES AT LIVERPOOL.

The noble pile of warehouses now being erected for Mr. Brancker, is unquestionably the largest yet erected in Liverpool, occupies the three fronts of Great Howard-street, Dublin-street, and Dixon-street, and covers 4,433 square yards of land, being only 407 yards less than an acre. It is divided into eleven warehouses, of something less than 400 square yards each, not including the walls. The external walls are 3½ bricks thick, and the division walls are three bricks. When completed, the warehouses will be 65 feet high, and will have six stories of rooms, besides the basement or cellar story. Every window throughout the pile is to be glazed with large sheets of plate-glass, and each is protected by a strong wrought-iron shutter, secured to an iron frame. The floors are formed by iron girders or beams, resting on columns of great strength, and are all secured together by wrought-iron coupling-bars. The bearing-beams rest on large blocks, made of Welsh fire-clay, and brick arches of 9 inches thick are to be thrown from beam to beam, the lateral thrust of the arches being counteracted by wrought-iron tie-rods, strongly secured to the beams, which are placed horizontally every 6 feet on the average. These connecting rods are 1¼ in. square, and are tested to resist a tension of thirty-five tons each. Every bearing-beam is also tested by a lever press at the building, to bear on its centre a pressure of thirty-eight tons, which is equivalent to a weight of four tons on each square yard. The floors of the whole structure are to be laid with Welsh fire-tiles, bedded in Terras mortar, there being an intervening stratum of sand to prevent the fracture of the arches, should heavy goods be thrown down upon them. The entrance-doors are made double—that is, of two separate plates rivetted together, having a cavity of an inch between them, with six small air-holes, so that if either side of the door became heated, the other side would be comparatively cool. The various rooms have also iron double doors of communication, each door being placed on the internal face of the wall, so as to leave a space of two feet between them. The staircases are inclosed from the rooms by walls of two bricks thick. These staircases are 18 feet long, by 7 feet 6 inches broad, and all the steps are of Yorkshire stone. Each staircase is to be provided with an upright main, of 6 inches diameter, which is to be supplied with water from the mains about to be laid down by the Sewerage Commissioners, and which, from the pressure of the Low-hill reservoir, will always be full of water. On each landing there is to be a brass stop-cock screwed, to fit either the hose kept on the premises (60 feet long being appropriated to each room), or it will fit the hose of the Commissioners and Fire Police, so that in case of fire, there will be an abundant supply of water on each landing, and instantly available. Small apertures are provided through which the branch can be inserted, and as each room will be perfectly air-tight, it will be impossible, if a fire occurs, for it to break out into flame. The staircases are so admirably constructed, that if every room in the building was on fire, men may be placed in perfect security on each landing, and pour a continuous stream of water into every room. All the entrance-doors are recessed back from the fronts of the building, and there are no projecting cat-heads or pent-houses beyond the line of the edifice. The roofs are all to be formed of wrought-iron trusses, covered with Welsh slates; and parapet-walls are to be built between each warehouse for additional security. Great attention seems to be paid to the drainage, there being three large dry wells of 5 feet diameter and 20 feet deep, and barrel sewers are being carried from all parts of the cellars into these wells. The whole of these magnificent buildings have been designed, and are being erected, by Messrs. Samuel and James Holme.—*Liverpool Journal.*

THE ALBERT DOCK AND WAREHOUSES, AT LIVERPOOL.

It is impossible to view the extensive excavation of the dock itself, or the immense piles of warehouses upon its margin, without seeing that we have been making provision for the future upon a scale of magnificence, and at an outlay proportionably commensurate with the importance of the vast estate under our control. The area of water space, for instance, to be gained by the construction of the dock, will be 7 acres 1,805 yards, or better than 7¼ acres. Some idea of this extent of water space may be formed, when we state that the Albert Dock will be nearly as large as the King's. The area of the latter is 7 acres 3,356 yards; that of the George's is 5 acres 154 yards; and that of the Waterloo is 5 acres 2,790 yards. The Albert, as we have said, will be upwards of 7¼ acres; and this is by no means an inconsiderable quantity of additional space, particularly when we take into consideration that the facilities expected to be afforded to the commerce of the town by the Albert Warehouses will enable it to despatch more business than a dock double its size. The subsoil which has been excavated, and the greater part of which has been waggoned, on an iron tramroad laid down expressly for the purpose, to Beacon's gutter, on the north shore, where it has been made available in filling up the strand and forming the outline of new docks, which are now, in point of fact, being carried out with the greatest vigour, amounted to about 440,000 cubic yards, at a cost of nearly 82,000*l.*

The dock is at present nearly excavated to the full extent, and from its immense depth will be capable of affording accommodation to vessels of the largest tonnage and draught of water. Its walls are constructed of solid masonry, principally of granite stone, with a slight inclination towards the top. The cement was manufactured by steam in a house erected for the purpose on the western quay, and the piles for the foundation of the warehouses were driven by steam, according to a simple and ingenious process, which the King of Saxony, during his visit to the dock, seemed particularly to admire. The entrance is 50 feet wide, and the gates are formed of the best material.

None of the warehouses are as yet completed. Some are in a state of great forwardness, others are being raised, and the foundation-stone of the remainder has still to be laid. Those which are approaching completion are the finest specimens of solid and substantial workmanship we have ever seen. There is nothing like them in Liverpool or any other port in England, with the exception perhaps of those round St. Katherine's Dock, in London. The Albert Warehouses consist of four spacious stories, each of which gradually diminishes in height as you ascend. For instance, the height of the first floor is 12½ feet, of the second 11½ feet, of the third 10 feet, and of the fourth 8½ feet. To this splendid pile of building immense vaults are attached, approachable by flights of stone steps. The vaults separately contain an area of 27,457 square yards. They are an average height of 8 feet, and will afford the amplest accommodation for the storage of wines, spirits, and other excisable articles. The area of the warehouse-room, inclusive of the vaults, and exclusive of the quay, amounts to the enormous number of 138,805 square yards.

Taking cotton as the basis of stowage, and limiting it to four floors of the warehouses only, omitting the vaults altogether, it is calculated they will contain about 234,950 bales. Supposing one-half of the quay should, in a time of great pressure, be temporarily used for stowage, an additional quantity of cotton may be accommodated to the extent of 32,037 bales, making a total of 266,987 bales.

The parliamentary estimate of the cost of the Albert Dock, basin, and river wall in front, was about 217,448*l.*, and that for the vaults and warehouses was 317,106*l.*, making together 534,554*l.* The cost of the land, inclusive also of the cost of Canning graving dock, was 247,711*l.*, making a total cost of 782,265*l.*—*Liverpool Courier.*

Sudbury Improvements.—The commissioners for *improving* the town of Sudbury are acting vigorously in the execution of their office: two more of the houses surrounding the church of St. Peter are in a course of demolition, and it is expected in a few months that venerable building will no longer be blocked up by the unsightly tenements, which could only have been erected in by-gone times, when, in the absence of all proper control, "every man did that which was right in his own eyes."

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